

- ① $6 \cdot 6 = 36$ $6 \cdot 6 \cdot 6 = 216 > 66$
| multiply once before product surpasses 66

A) 1

- ② Integers can be $\dots -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots$
There are an infinite number of integers less than 50.

E) NOTA

- ③ A prime number is larger than one, and has divisors 1 and itself.
Out of the choices, 111 and 181 are larger than one, but 111 is divisible by 3. 181 is prime.

D) 181

- ④ $x = 5$, so $\frac{x^2 - 10x + 25}{73} = \frac{5^2 - 10(5) + 25}{73}$
 $= \frac{25 - 50 + 25}{73}$
 $= \frac{0}{73}$
 $= 0$

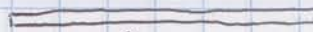
A) 0

- ⑤ $\frac{20}{2}$ is $20(\frac{1}{2})$. $20(3) = 60$

$$\frac{\frac{1}{2} \text{ story}}{3 \text{ minutes}} = \frac{\frac{20}{2} \text{ stories}}{60 \text{ minutes}}$$

C) 60

- ⑥ The rectangle can be very skinny.
Imagine solving the problem with
a rubber band that has a
circumference/perimeter of 25 inches.

 ← small width, almost 0 inches

↑ length is about half of 25 inches
very close to 12.5 inches

$$\frac{25}{2} = 12.5$$

out of the choices, 13 is the closest number.

D) 13 inches

- ⑦ volume of a sphere = $\frac{4}{3}\pi r^3$

$$\frac{4}{3}\pi (2^3)$$

$$= \frac{4}{3}\pi (8)$$

$$= \frac{32}{3}\pi$$

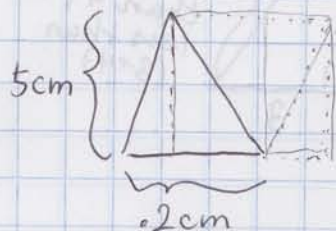
c) $\frac{32}{3}\pi$ inches³

- ⑧ man = 300 (teacher) teacher = 25 (Fred)
man = 300 (25 (Fred))
man = 7500 (Fred)

This man was 7500 times calmer
than Fred.

A) 7500

⑨ Area of triangle = $\frac{1}{2}(\text{base})(\text{height})$



$$= \frac{1}{2}(0.2)(5)$$

$$= \frac{1}{2}\left(\frac{2}{10}\right)(5)$$

$$= \frac{5}{10}$$

$$= \frac{1}{2} \text{ cm}^2$$

B) $\frac{1}{2}$

⑩ $\frac{11}{39} \approx .282...$

$\frac{16}{49} \approx .3265...$

$\frac{20}{41} \approx .4878...$

$\frac{23}{50} \approx .46$

$\frac{13}{43} \approx .3023...$

$\frac{21}{46} \approx .4565...$

B) $\frac{16}{49}$

⑪ $x^2 = 529$

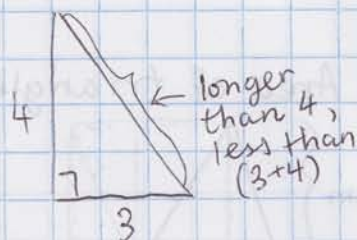
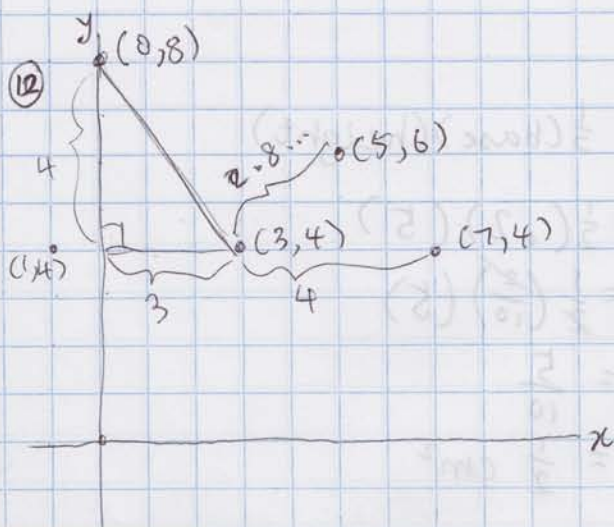
$\sqrt{x^2} = \sqrt{529}$

$x = \pm 23$

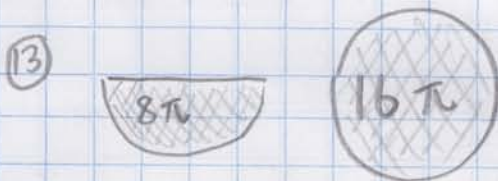
$x = 23$

question asks for positive value

A) 23



B) $(0,8)$ is the only point out of the choices that is more than 4 units away from $(3,4)$



$$A = \pi r^2 = 16\pi$$

$$r^2 = 16$$

$$r = 4$$

a) 4

④ • positive cube root of 343

is $\sqrt[3]{343} = 7$

To check, $(7)(7)(7) = 7^3 = 343$

• square root of 1

is $\sqrt{1} = 1$

To check, $(1)(1) = 1^2 = 1$

So, $(\sqrt[3]{343})(\sqrt{1}) = (7)(1) = 7$

c) 7

⑤ 6 · 5 · 4 · 3 · 2 · 1 = 720 ways

c) 720

⑥ In mathematics, division by zero is undefined.

If $\frac{x}{0} = y$, then $x = 0 \cdot y$.

Dividing 0 by 0 also doesn't make sense because "dividing by 0" means "multiplying by the inverse of 0," which doesn't exist.

Eventually, you will learn that

$\frac{x}{0}$ approaches $\pm \infty$

E) NOTA

① 2, 22, 242

↖ ↗
at each step, the number
is multiplied by 11.

$$242(11) = 2662$$

c) 2662

⑧ $\frac{24}{54} = .\overline{444} \dots$ ← repeating decimal

let $x = .\overline{444} \dots$

$$\begin{array}{r} 10x = 4.\overline{444} \dots \\ - x = .\overline{444} \dots \\ \hline \end{array}$$

$$9x = 4$$

$$x = \frac{4}{9}$$

Since the question asks for the percent,

$$\begin{aligned} \frac{24}{54} &= .\overline{444} \dots = 44.\overline{444} \dots \% \\ &= 44 \frac{4}{9} \% \end{aligned}$$

⑨ $44 \frac{4}{9} \%$ grow slowly

$55 \frac{5}{9} \%$ grow sluggishly

D) 56%

$$\begin{aligned}
 (19) \quad & \frac{1450(x^3 - 63)}{1000} \\
 &= \frac{1450(4^3 - 63)}{1000} \\
 &= \frac{1450(4 \cdot 4 \cdot 4 - 63)}{1000} \\
 &= \frac{1450(64 - 63)}{1000} \\
 &= \frac{1450(1)}{1000} \\
 &= 1.450
 \end{aligned}$$

A) 1.45

(20) If the greatest common factor of two numbers is 1, then the two numbers are relatively prime.

$$\begin{aligned}
 132 &= 11(12) & 56 &= 7(8) & 105 &= 7(15) \\
 9 &= 3(3)
 \end{aligned}$$

31 is prime, so its factors are 1 and 31.

B) 14 and 31

$$\begin{aligned}
 (21) \quad & 3 - (5 - 12) + [56 + 24(-1)]\left(\frac{1}{2}\right) \\
 &= 3 - (-7) + (56 - 24)\frac{1}{2} \\
 &= 3 + 7 + (32)\left(\frac{1}{2}\right) \\
 &= 10 + 16 \\
 &= 26
 \end{aligned}$$

B) 26

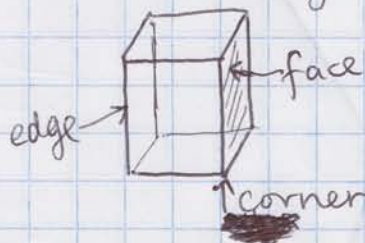
22) $8 = 2^3$ Factors of 8 are 1, 2, and 8

$114 = 3 \cdot 2 \cdot 19$

B) 2

23) Euler's formula = for a convex polyhedron, $F + V - E = 2$

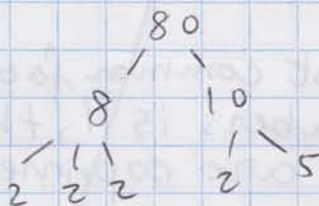
For a rectangular prism, $F=6, V=8, E=12$



$6 + 8 - 12 = 2$

C) 2

24)



$80 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5$ 1 is not prime.

C) $(2)(2)(2)(2)(5)$

25) All square numbers are composite

Positive square numbers under 100:

$1, 4, 9, 16, 25, 36, 49, 64, 81$
 $= 1^2, 2^2, 3^2, 4^2, 5^2, 6^2, 7^2, 8^2, 9^2$

B) 8

prime

composite

26) 1 week = 7 days = 7(24) hours
 1 week = 168 hours

$$\frac{2 \text{ stories}}{x \text{ stories}} = \frac{12 \text{ hours}}{168 \text{ hours}}$$

$$\frac{2}{x} = \frac{12}{168}$$

$$12x = 2(168)$$

$$x = \frac{2(168)}{12} = 28$$

b) 28

27) $C = 2\pi r = 2\pi (5.19)$
 ~~$= 2\pi (10.38)$~~

$$= 10.38\pi$$

$$\begin{array}{r} 5.19 \\ + 5.19 \\ \hline 10.38 \end{array}$$

c) $10.38\pi \text{ m}^2$

28) $\sqrt{\frac{16}{25}} = \frac{\sqrt{16}}{\sqrt{25}} = \frac{4}{5} = .8$

c) $\sqrt{\frac{16}{25}}$

29) $\sqrt{1} = 1$ $\sqrt{4} = \pm 2$ $\sqrt{9} = \pm 3$
 $\sqrt{5} = 2.236\dots$

c) $\sqrt{5}$

30

$$b(y = -40x - 6)$$

same as $y = -40x - 6$

d) no change

$$S(21, P) \pi$$

$$K(21, P) \pi$$

$$S(21, P) \pi$$

$$\pi(21, P)(S)S + \pi^2(21, P) + \pi^2(21, P) = 0.010 \cdot 0.010 \cdot 0.010$$

$$\pi(21, P)S + S(\pi^2(21, P)) =$$

$$(\pi(21, P)S + \pi^2(21, P))S(0)$$

$$0.010 = \frac{1}{2} \cdot 0.010 = \frac{0.010}{2} = \frac{0.010}{2} = \frac{0.010}{2}$$

$$S \pm = 0.010$$

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